

Assessing and Managing Disease Risks in Wildlife

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The University of Georgia

SCWDS



Pennsylvania 1983 - HPAI

Haiti 1984 - ASF

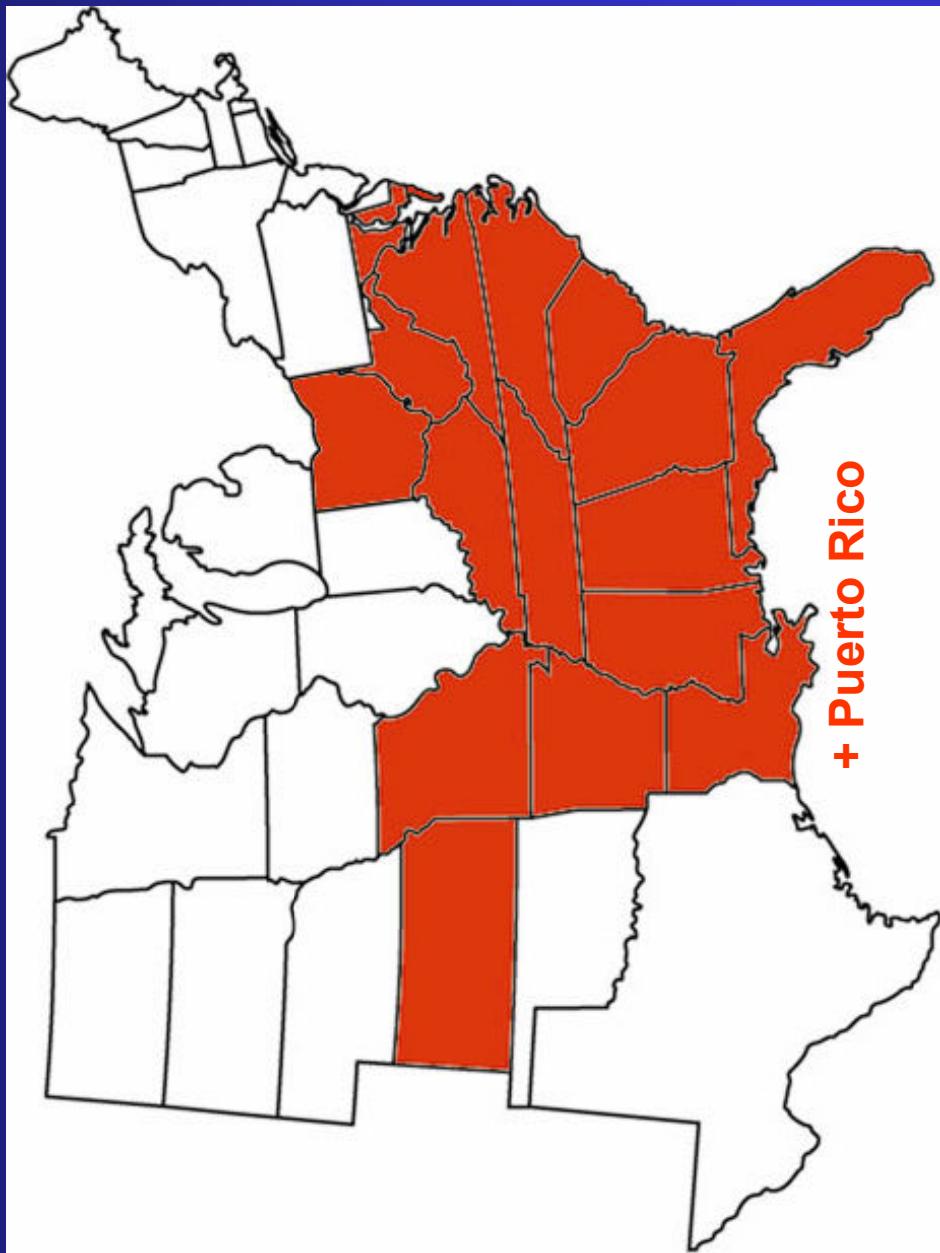
Southeastern Cooperative Wildlife Disease Study

Founded in 1957 to investigate deer mortality
University of Georgia, College of Veterinary Medicine
Contracts with wildlife agencies of 17 states (N. Carolina)
US DOI funding began in 1963
Cooperative Agreement with USDA-APHIS-VS since 1979



Texas 1971 - END

Member States - 2006



Objectives

Detect causes of sickness and death in wildlife

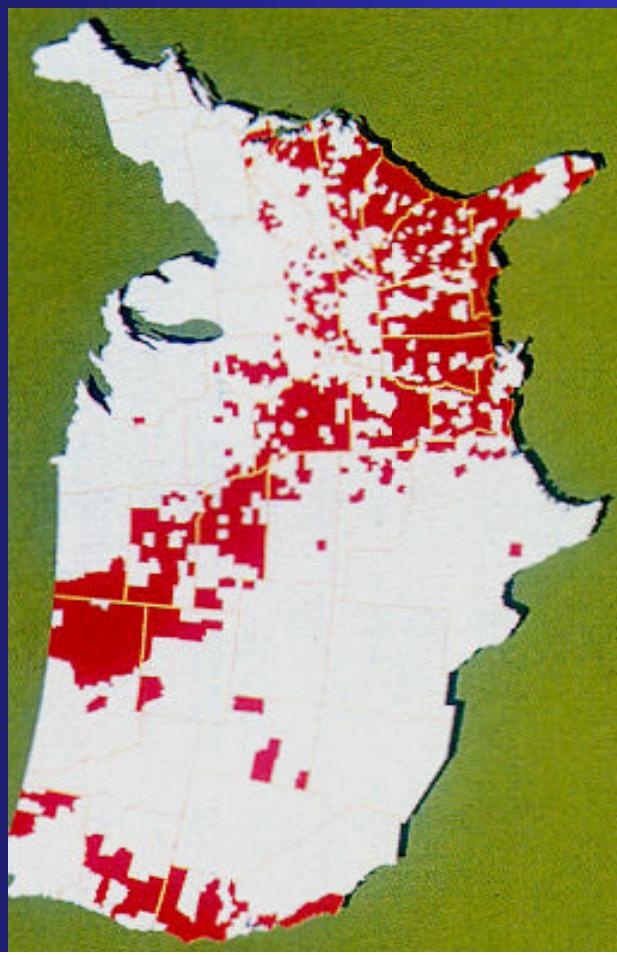
Define the impact of diseases and parasites on wildlife populations

Delineate disease relationships among wildlife and domestic livestock

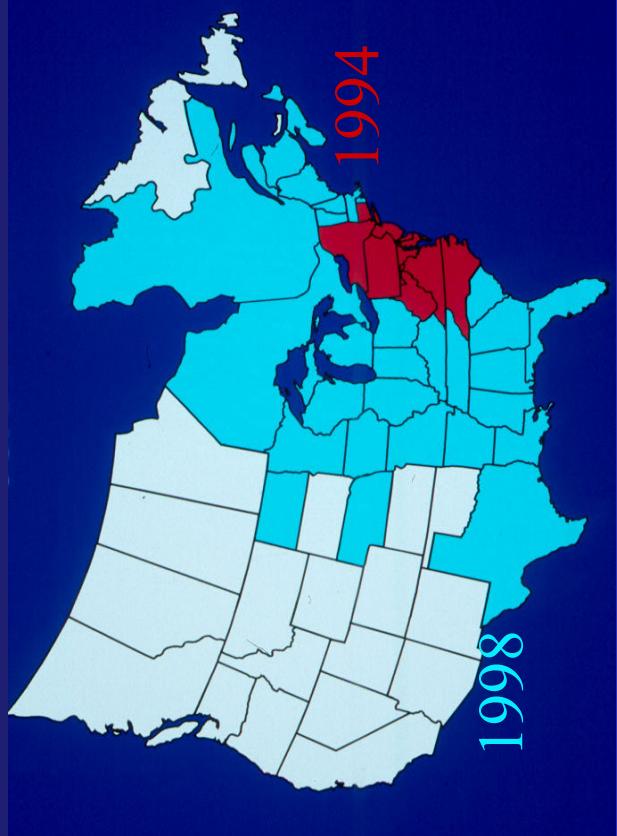
Determine the role of wildlife in the epidemiology of human diseases



Assemble & Evaluate Wildlife Disease Data



Hemorrhagic disease of deer
1980 - Present



Finch conjunctivitis

Livestock/Wildlife Disease Interactions

Emergency (FAD) preparedness,
surveillance, and response

- training state wildlife agencies
- training FADDs
- assist USDA and states with planning, task forces and test exercises
- FAD & vector surveillance

Keep Foot-and-Mouth Disease **OUT** of America

Remember to declare **any** visits to farms or contact with livestock
Remember to declare all food and agricultural items in your
possession to your Customs Brokers
Failure to do so could result in a fine of up to \$1,000.



U.S. Department of Agriculture

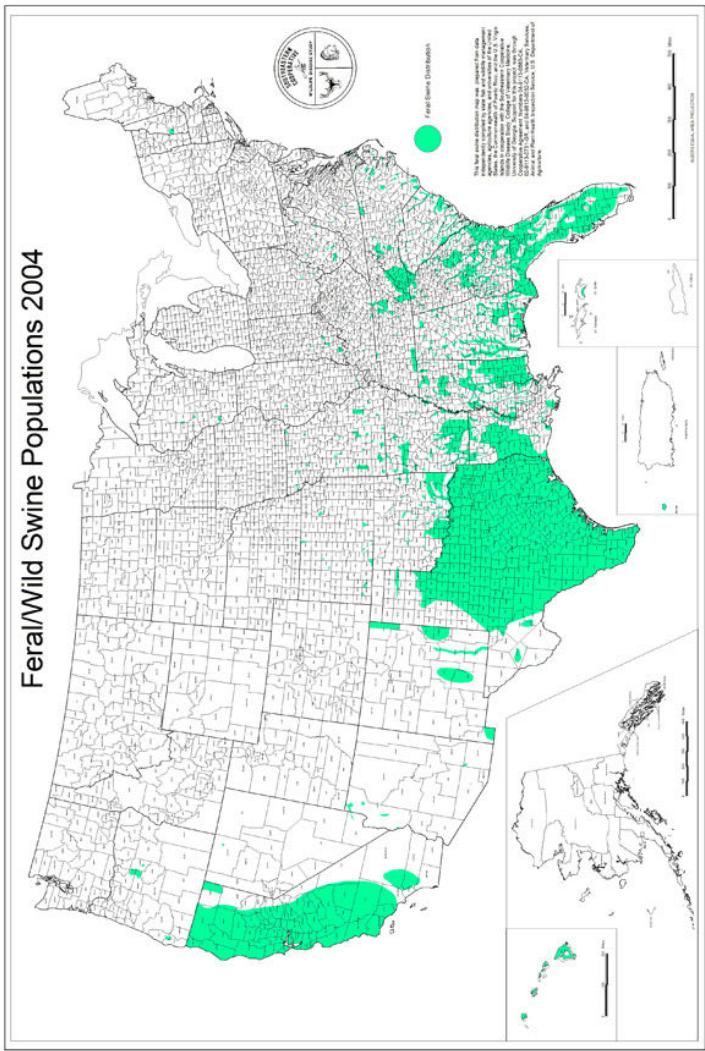
Animal and Plant Health Inspection Service

Customs Brokers



Livestock/Wildlife Disease Interactions

Research and surveillance of diseases/agents including PRV, VSV, ASF, MG, AIV, END, Brucellosis, Johne's, Fever ticks, *M. bovis*, *E. coli* O157:H7, etc



Role of Wildlife in Human Disease

NIH & CDC grants, collaboration with State Public Health Agencies

Projects include Lyme Disease, *Ehrlichia*, Rabies, WNV, HPAI



Susceptibility of North American Ducks and Gulls to HPAI (EID, 2006)

Free-Ranging Wildlife

This presentation concerns free-ranging birds and mammals
Zoo and exotic animals, and captive wildlife are included
only when noted



Background Economics

Fish and wildlife
recreation is BIG
BUSINESS

There is a large public
constituency

Economic importance
under-recognized



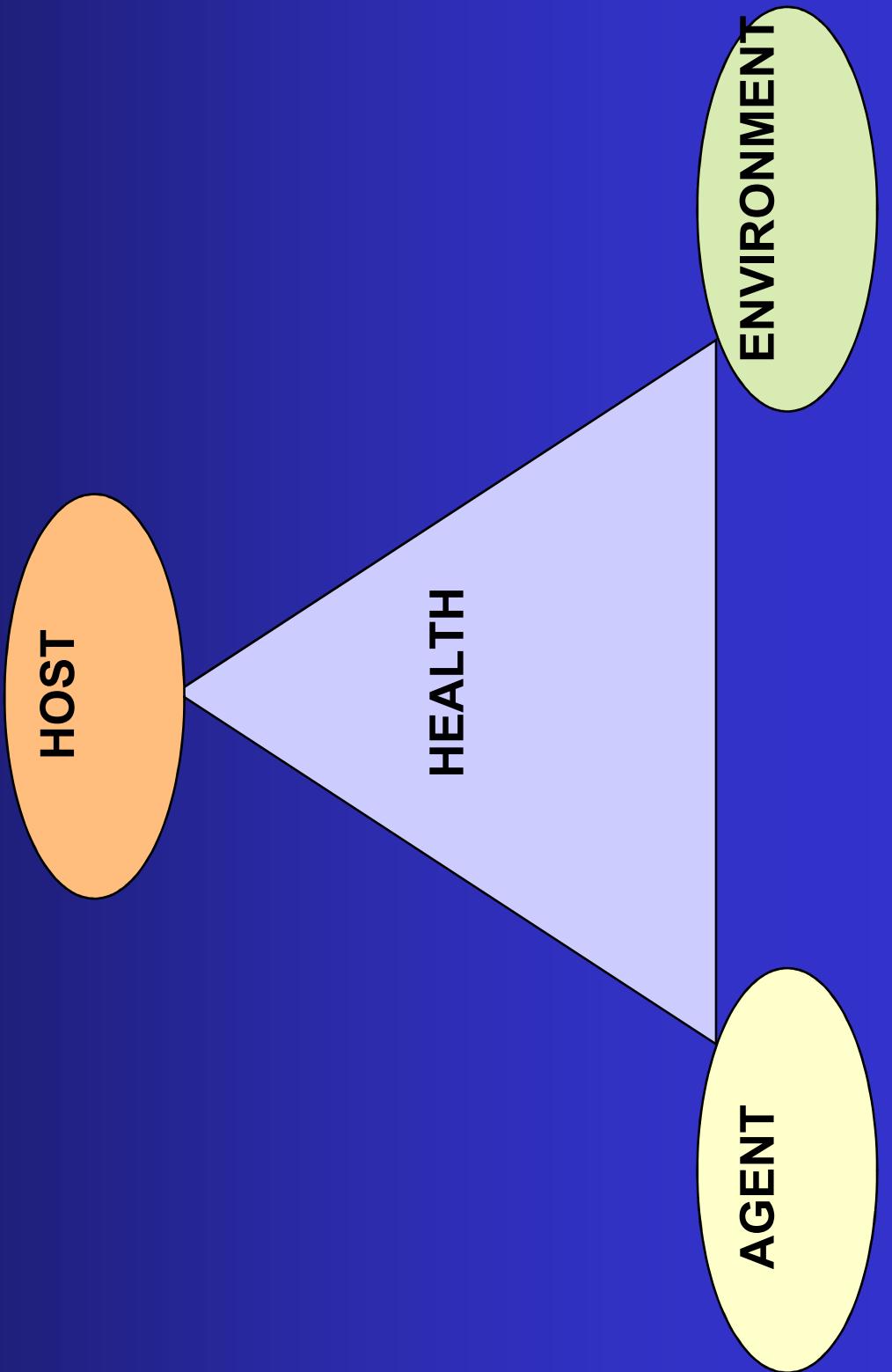
National Survey - 2001

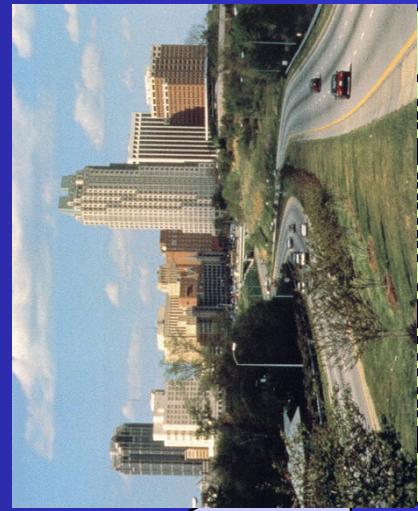
- 82 million Americans (32%) participate in wildlife-associated recreation
- Spend \$109 billion annually (1.1% of GDP)
- 34 million fish and spend \$36 B
- 13 million hunt and spend \$ 21 B
- 66 million “non-consumptive users” enjoy wildlife and spend \$26 B

Federal Aid in Wildlife Restoration (Pittman-Robertson Act, 1937)

- Self-imposed, Federal excise tax on firearms, ammunition, and archery equipment
- Federal funds are provided to states for the restoration and improvement of wildlife habitat & research, and for the distribution of information
- An allocation formula based on the total area of the state and licensed hunter numbers is used to distribute funds
- Through this program, hunters have funded much of the conservation of many game and non-game species

Diseases in Wildlife: Assessing and Managing Risks

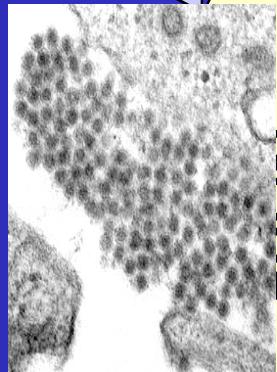




ENVIRONMENT

HOST

HEALTH???

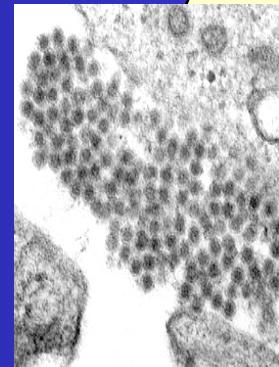


AGENTS

HOST



HEALTH???



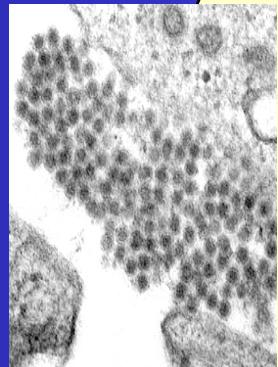
HOST



HEALTH???



ENVIRONMENT

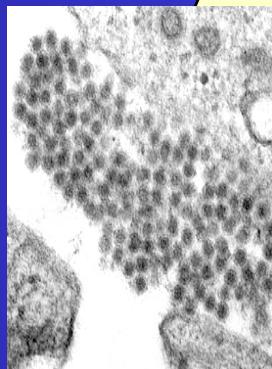




ENVIRONMENT

HOST

HEALTH???

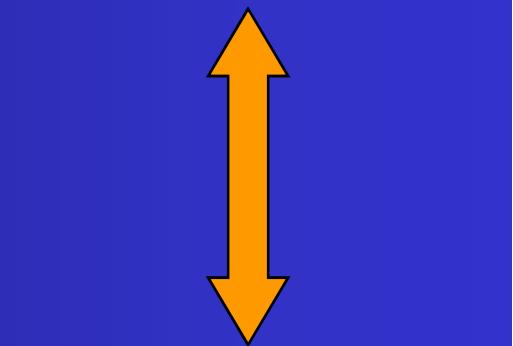


Generalities

Wild species generally are susceptible to the same disease agents as livestock and poultry

Transmission is a two-way street between domestic animals and wild animals

Wild animals, due to natural dispersion, are less likely to maintain livestock diseases



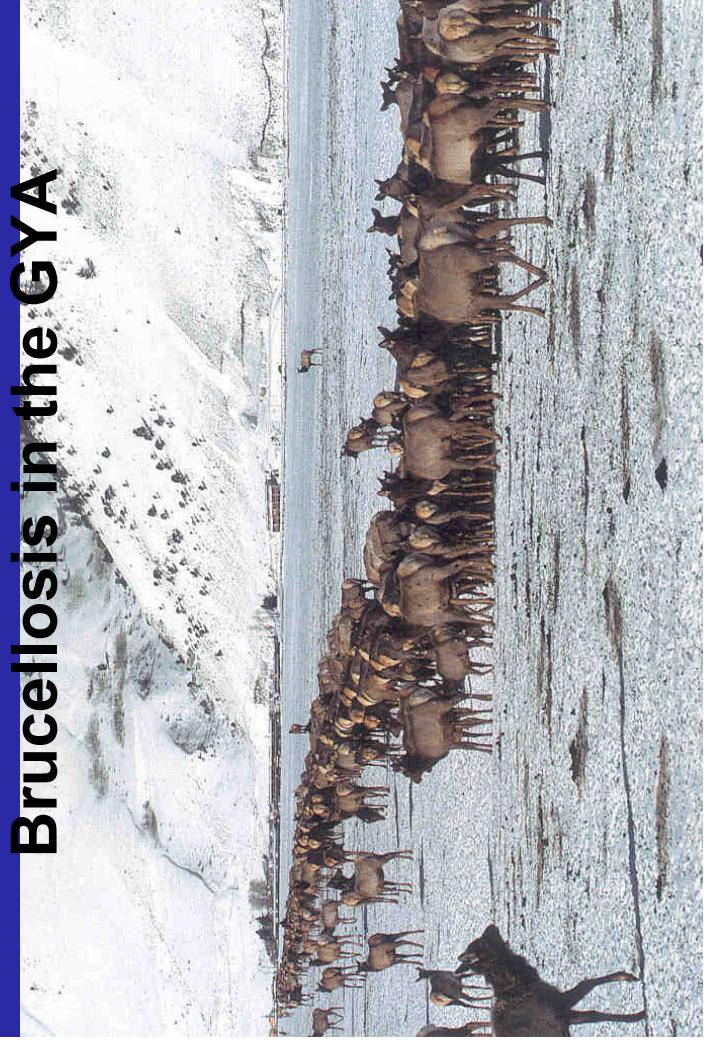
Disease Agents in Wildlife

Many disease problems in wildlife are associated with unnatural or artificial situations

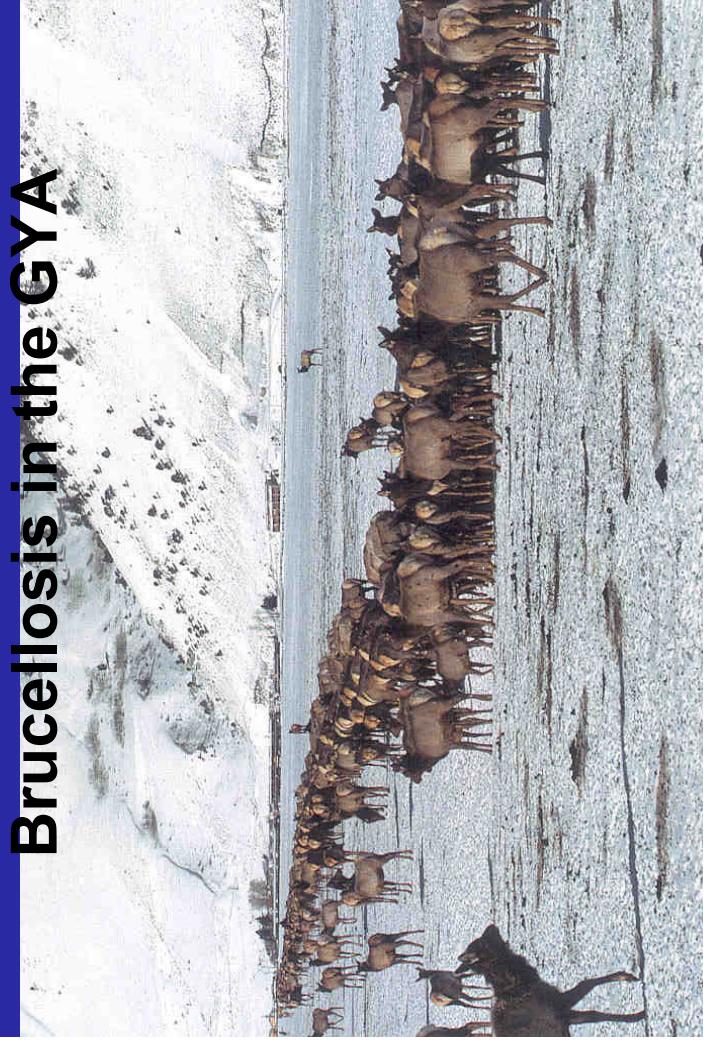
Finch conjunctivitis



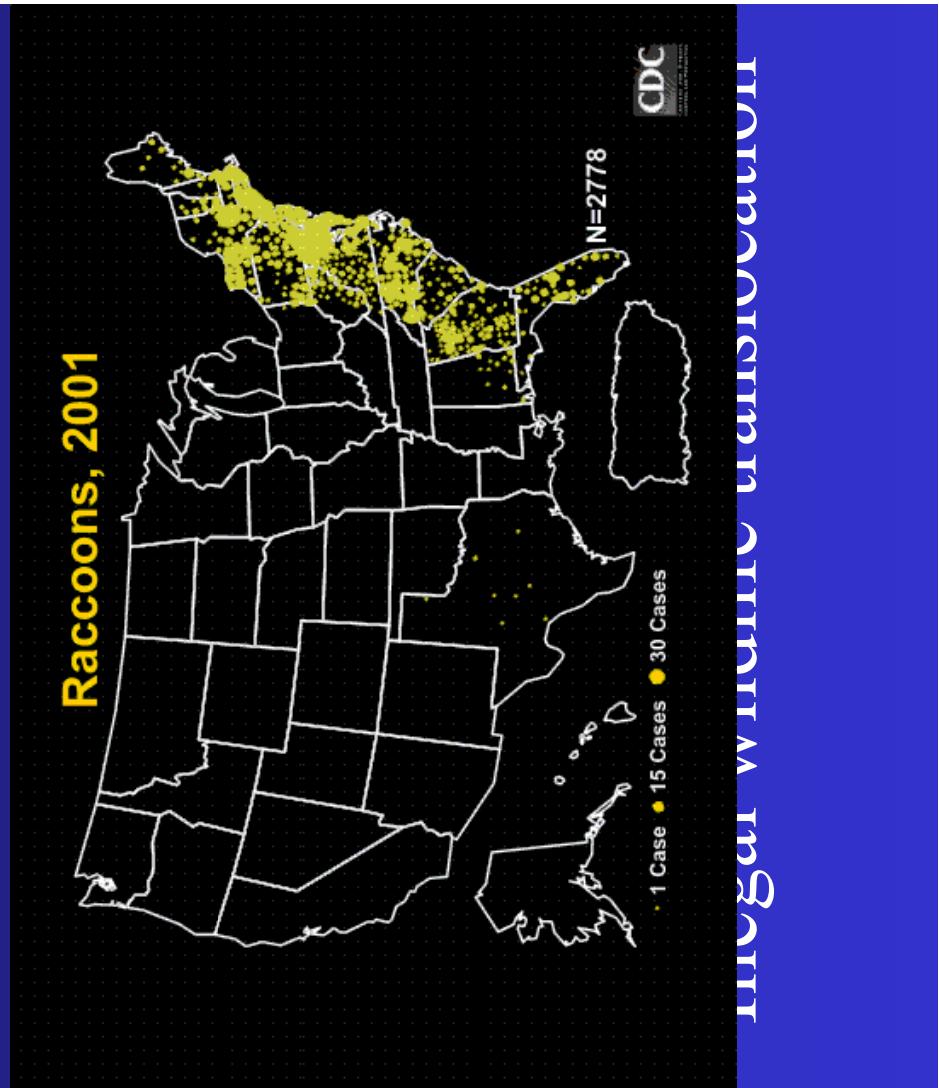
Bovine TB in Michigan



Brucellosis in the GYA



Disease Problems in Wildlife



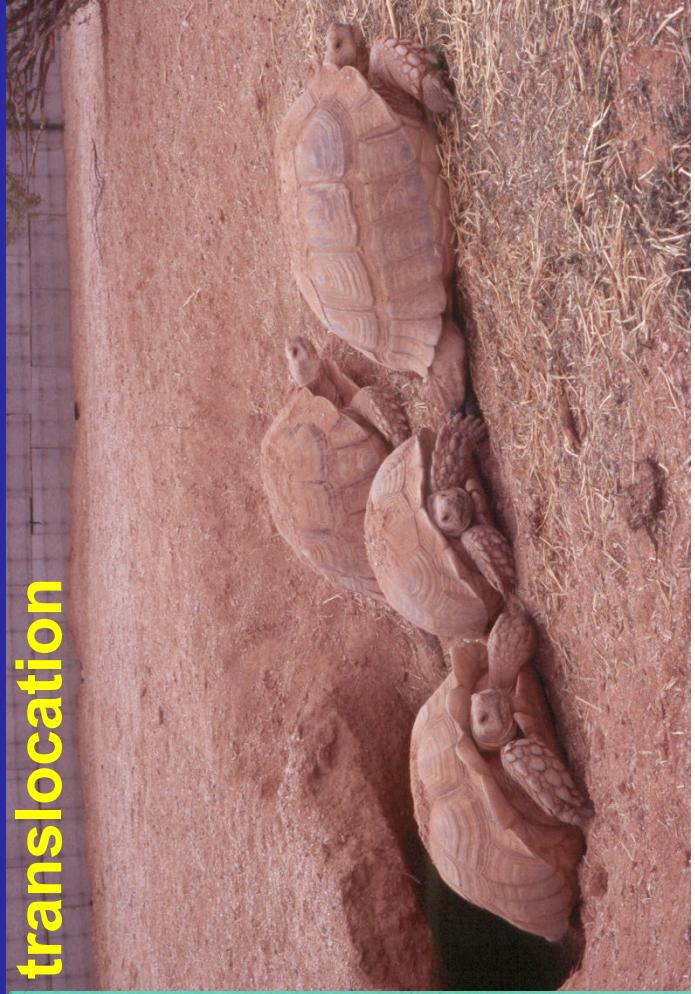
Nov 94 - Jan 95

349 import shipments, 117,690 reptiles

142 species of reptiles, 82 genera

Ticks recovered from 92 shipments (28%)

13 species of *Amblyomma*, *Aponomma*, *Hyalomma*



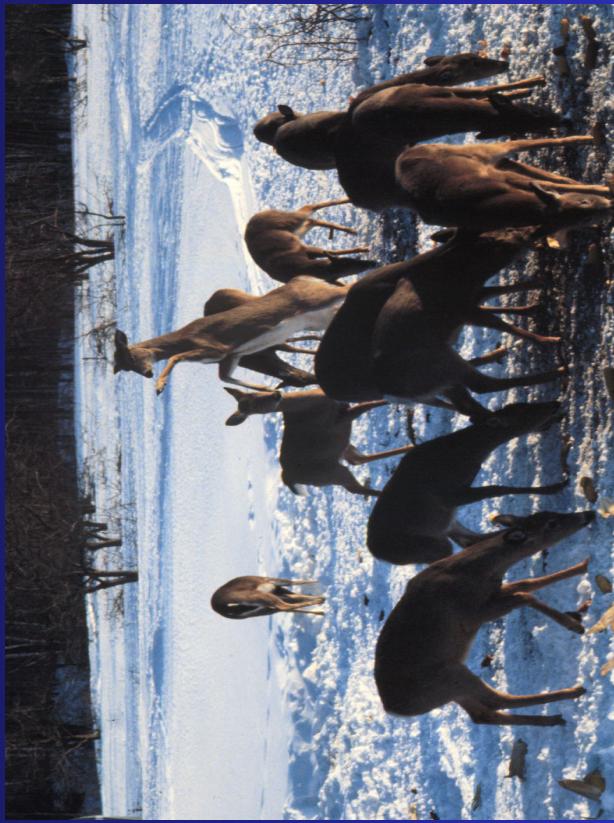
Many “wildlife diseases” are livestock diseases that have been introduced & established in wild animals



Bovine TB – Kruger National Park,
South Africa

Disease Agents in Wayne

Nettles' Rule: Once a disease has become established in free-ranging wildlife... you've got big trouble



PC Version: There is no substitute for prevention

Prevention is the only truly effective way to manage disease in wildlife



Disease Risks

Disease agents in wild animals can present risks to:

Other wild animals

Domestic animals

Humans



Human Issues

The Wildlife-Livestock Disease Interface

Who Is Concerned and Why?

LIVESTOCK/Poultry Producer



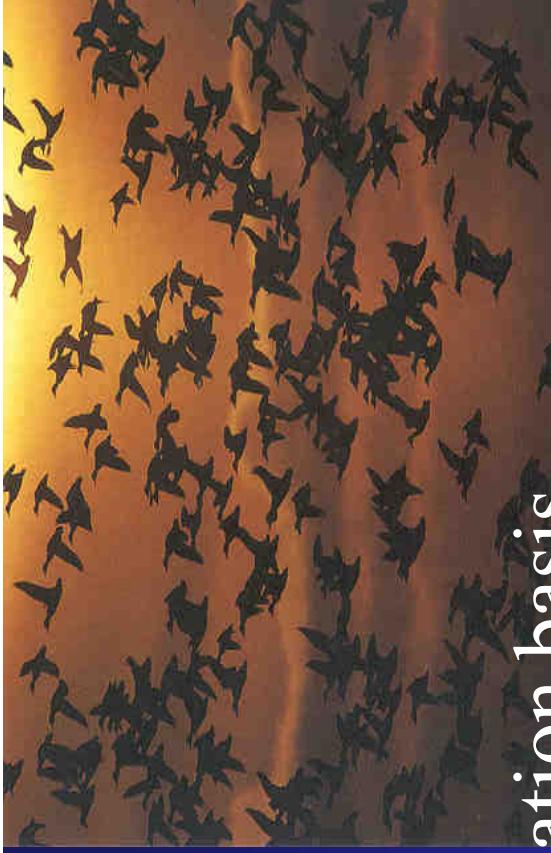
- Risk of disease introduction
- Economic losses due to testing, quarantines, vaccination, etc.
- Loss of foreign markets
- Loss of grazing access
- Reservoir for diseases nearing eradication in livestock: TB, brucellosis, PRV (feral swine)

Wildlife Manager/ Consumptive User/Enthusiast

- Direct risk of disease losses
 - Indirect risk via perceived or real involvement in epidemiology
- Potential conflict between
wildlife and livestock interests



Wildlife/Agriculture: Common Ground



- Manage animals on a population basis
- Lose land to development/sprawl
- Saving farms benefits wildlife
- Mutual animal rights threat
- Mutual foreign animal disease risk
- Many people are involved in both activities...





Significance of Disease Agents III Wildlife to Humans/Domestic Animals

Infected wild animals may represent a true risk factor for humans and domestic animals...

Or may pose little or no risk, such as house finches with *Mycoplasma gallisepticum*... but other wildlife may be at risk



The Level Of Risk Must be Assessed

Is risk reduction necessary, feasible, or affordable?

Factors to consider when assessing risks due to an infectious disease agent in wildlife

Epidemiology of the disease

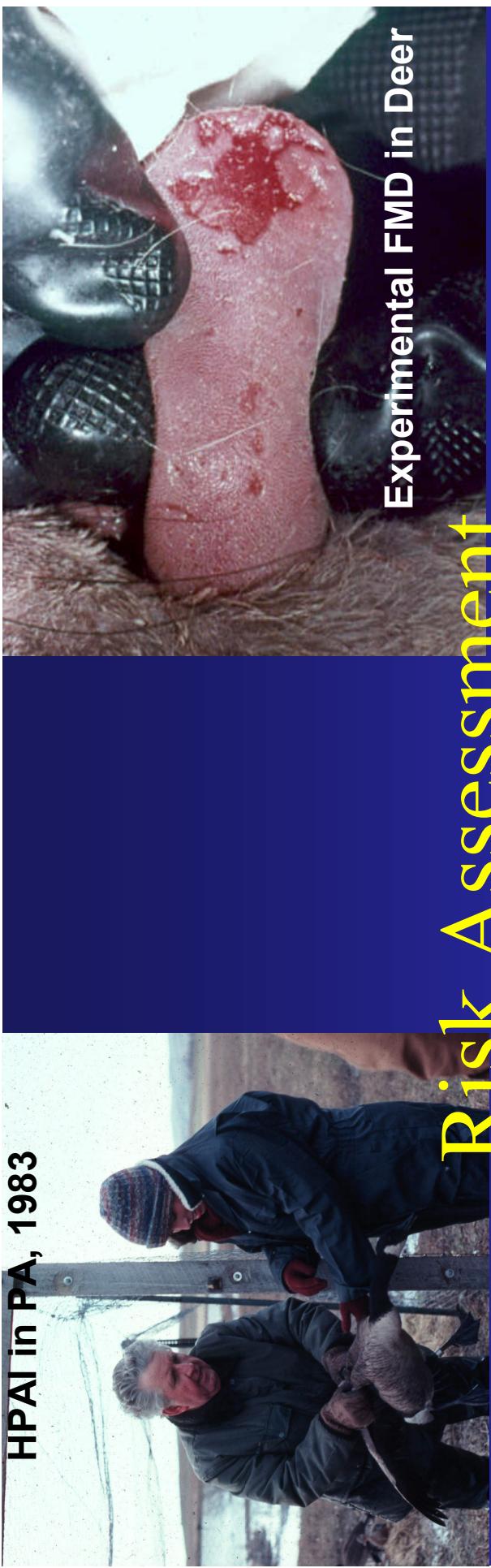
Ecology/ biology of wild animals involved

Humans, domestic, and wild animals at risk

Interfaces between
humans, domestic
animals, and wildlife
eliminating or reducing
these interactions is
critical because
controlling disease in
wildlife is difficult and
expensive, when it is
possible at all!



HPAI in PA, 1983



Risk Assessment

Experimental FMD in Deer

Scientific literature - A good starting point

Field data from previous occurrences

Experimental and field studies in wildlife

Often there is little information regarding disease in non-domestic species
Essential to develop additional information during risk assessment and
management activities - to adapt strategies and for the next thing that
comes along...

RISK ASSESSMENT.

Information Gathering

Local information -

Variety of agencies with different expertise

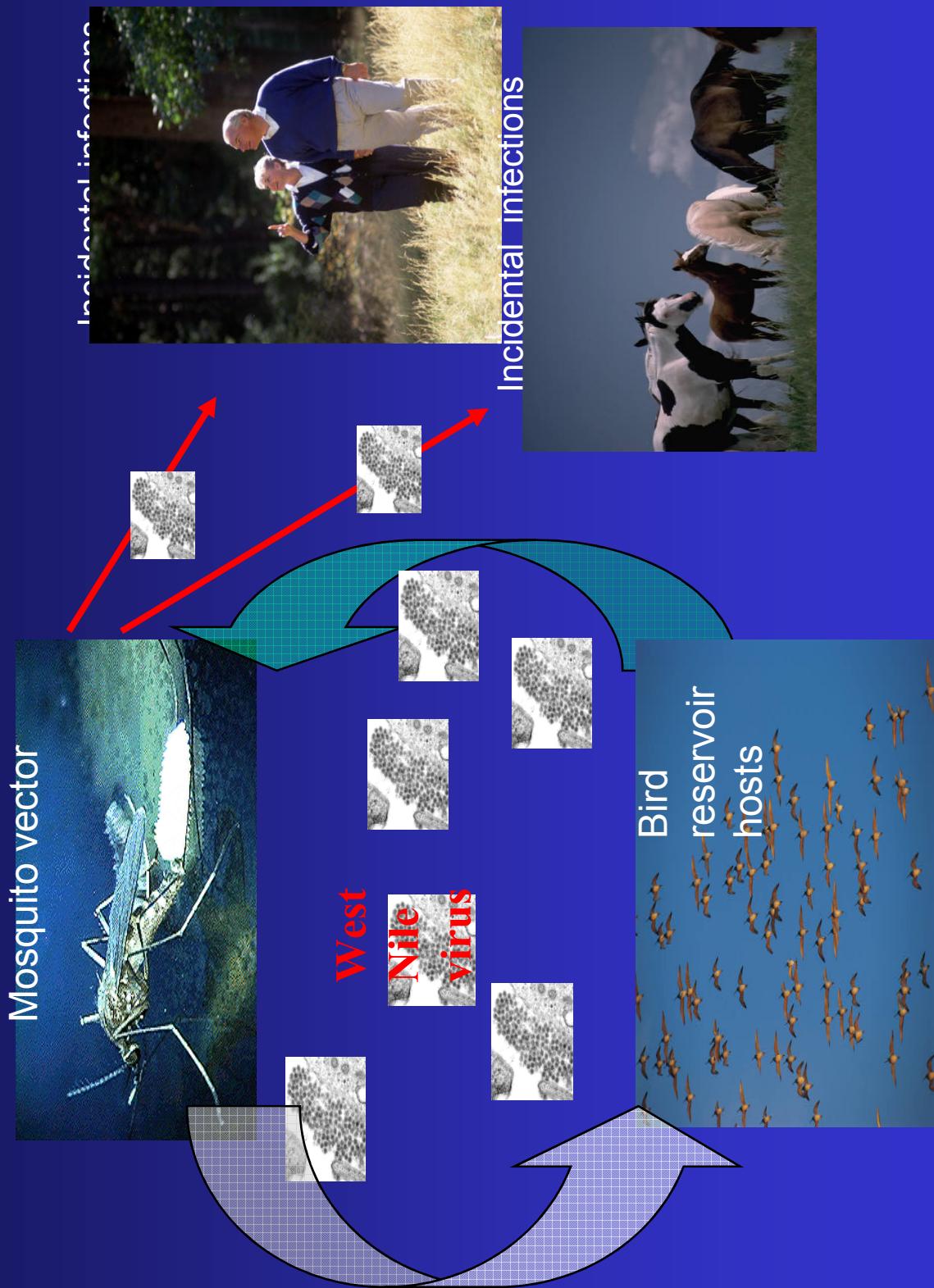
Human Health - disease incidence in people

Animal Health - numbers, husbandry, and disease status of domestic animals

Wildlife Management - density and distribution of wild animals important in epidemiology, their biology, prevalence of disease

COMMUNICATION-COOPERATION

West Nile Virus Transmission Cycle



Human diseases

Governmental public health agencies monitor diseases in human populations



Livestock and poultry diseases

Animal health regulatory agencies involved (state and fed)

Variety of methods

Morbidity and mortality,
Abattoir surveys

Serological surveys,
Eradication programs

Surveillance Of Disease Agents

Wildlife Diseases

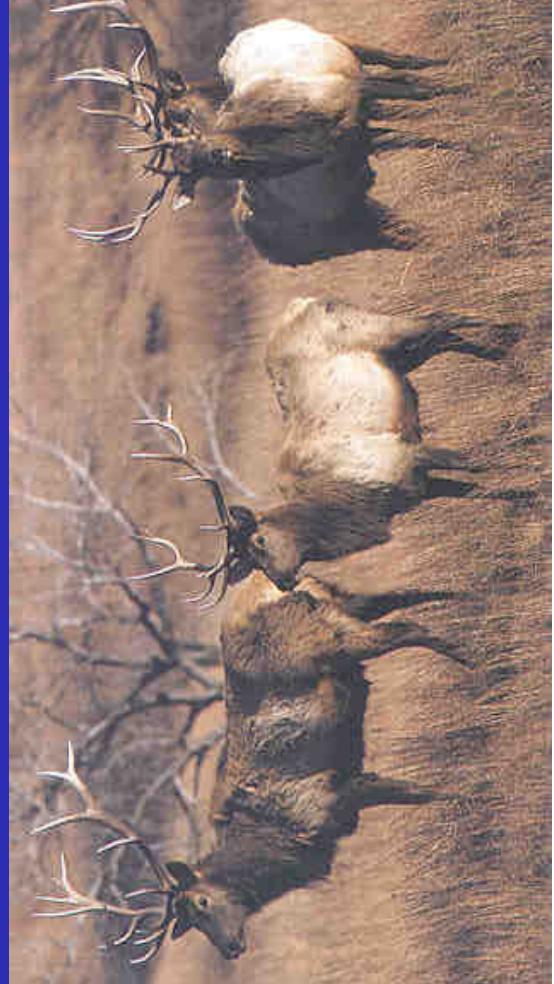
Challenging due to authority issues, responsibility, and FUNDING

Interagency cooperation to gain maximum data

Carcasses – mortality events, hunter-killed animals

Captured animals

Other sources



Detection of Disease Agents

- Detection of outbreaks missed or delayed
- Capture/testing may injure or kill animals
- Need significant sample of population
- Tests validated for domestic animals may not work



Disease Management in Wildlife

Challenging: few proven strategies known
Labor intensive and expensive (**no substitute for prevention!**)

Strategies based upon manipulation of:

Disease agents

Host

Environment

Human activities
(Wobeser, 1994)



Management Of Disease Agent

- Control the disease agent or its vector
- Very difficult in wildlife (not easy in domestic animals)
- Screw worm eradication is an example benefit to livestock and to wildlife such as deer



Screw worms



Host Population Management

- More options available:
 - Removal of infected or exposed animals
 - Reduction of population density to decrease opportunities for disease transmission
 - Total depopulation of wildlife is unlikely expensive and difficult
- potential problems with public opinion

Whitetail Population Management

Manipulation of population density and distribution

wildlife management agencies are experienced
Public participation such as legal hunting
reduced costs
better acceptance
Public acceptance is essential for success



Other Strategies for Host Management



Treatment of sick or exposed animals

Population impact unlikely
Expensive, difficult, &
potentially harmful

Vaccination of Wayne

- Requires appropriate conditions - a limited and isolated population works best
- Requires effective vaccine, multiple applications (=\$\$\$)
- Requires delivery system for species & local situation - must reach significant portion of the population
- Growing area of interest with certain diseases



Vaccination of Wildlife

Examples include oral rabies vaccination of carnivores

Oral vaccination of wild boar for classical swine fever in Europe

Vaccination of elk in GYA for cattle brucellosis using a “biobullet”



Environment and Habitat Manipulation to Control Disease

Create areas unattractive to wildlife

a “barrier” between wildlife and susceptible
domestic animals and humans

Results usually are not rapid

Effects generally long lasting

Management of Human Activity

May be most efficient because of the expense and difficulty of managing disease in wildlife
However, this is based on a huge assumption:
Managing humans is easier than managing wild animals

Managing Human Activity

Such as wildlife feeding

Unnatural congregation

“Wildlife daycare center”

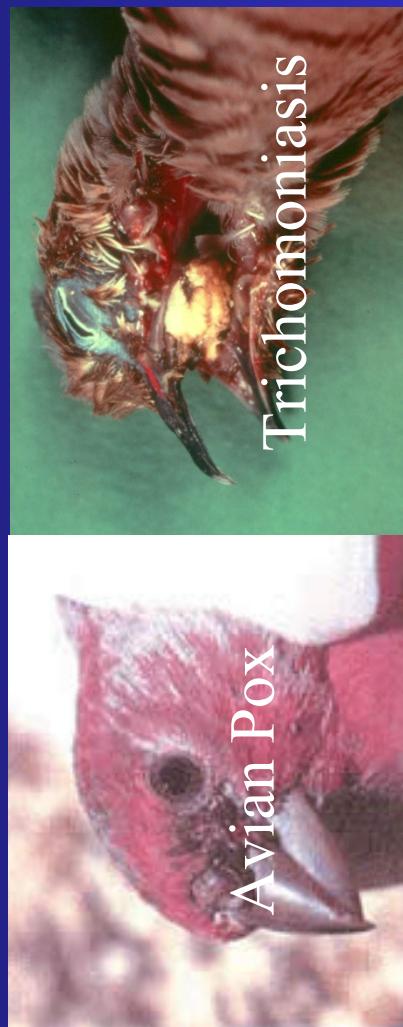
May inflate population density beyond carrying capacity of habitat



BIRD FEEDERS AND ASSOCIATED DISEASES

Birdfeeders are associated with transmission of at least 5 common diseases of songbirds

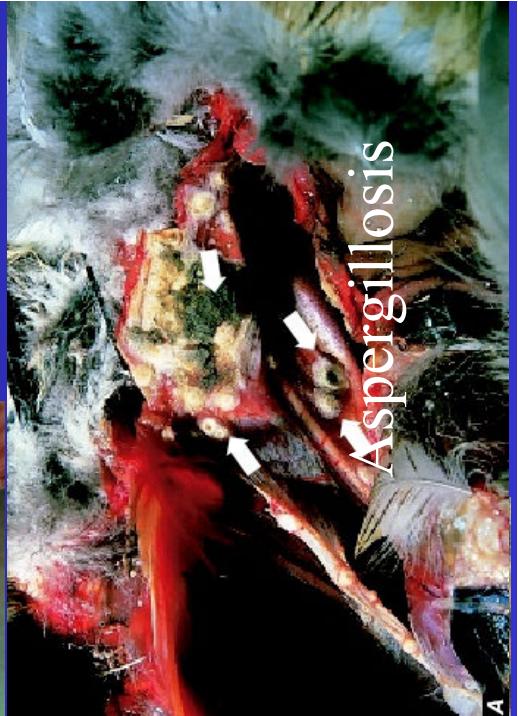
Who wants to recommend that people stop feeding birds???



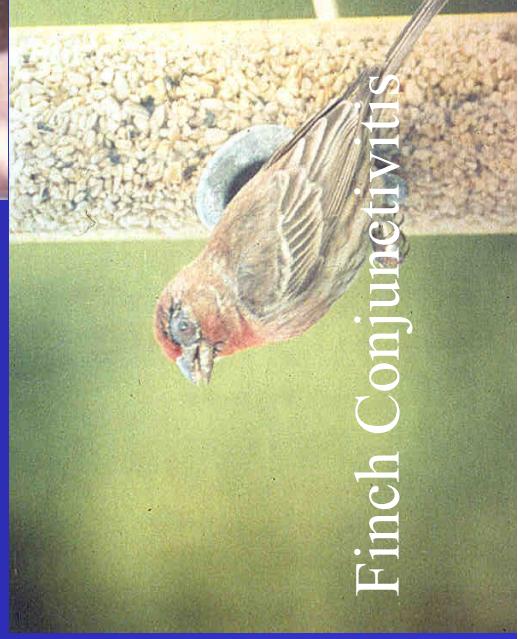
Trichomoniasis



Avian Pox

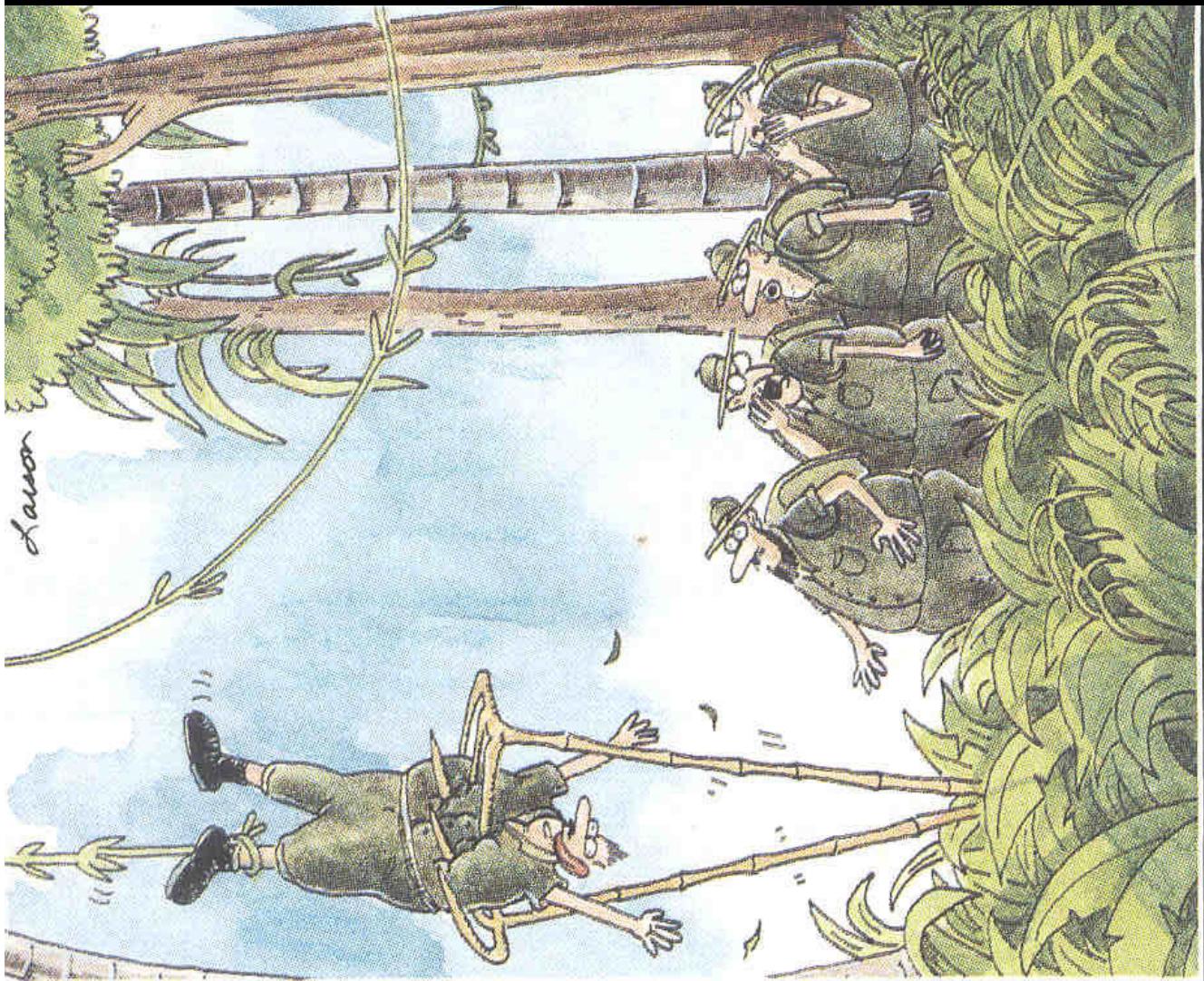


Aspergillosis



Finch Conjunctivitis

Salmonellosis



“That’s why I never walk in front.”

Moving infected animals

“Asian H5N1” avian influenza virus isolated from two crested hawk-eagles from Thailand confiscated from airline passenger in Brussels



Private ownership of native wildlife species
Monkeypox outbreak in 2003 (also involved moving infected animals)
Chronic wasting disease (a TSE) in captive cervids



Biosecurity and Protection

- Disease control in wildlife may not be feasible or affordable
- May need to protect humans and domestic animals
- Often most cost effective and successful
- Physical barriers - partitioning or containment
 - Fencing, housing, window screens, etc.
 - Immunization of humans or domestic animals
- (Combination of environment and host management)



Fight the bite!

Public Education

- Essential in risk reduction
- Facilitate human compliance
- Important for livestock and poultry producers and the general public



Risk Reduction Strategies

- A combination of the available methods may be used to increase chances for success
- Management strategies should be adapted as new information on the disease and management techniques becomes available

Key Points

- Prevention is the number one priority
- Disease control is complex, difficult, and costly – is it necessary or even possible?
- Financial and technological restraints
- Public opinion may hinder efforts

Key Points

Communication and cooperation between multiple agencies and interest groups offer the only chance for success

The field of controlling diseases in wildlife is growing and evolving in response to

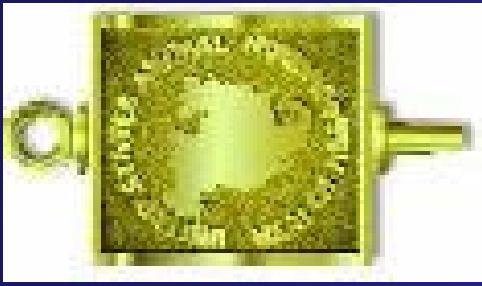
new situations

new technology

needs of animal agriculture, human health, and wildlife resource interest groups

Organizations

United States Animal Health Association –
Committee on Wildlife Diseases

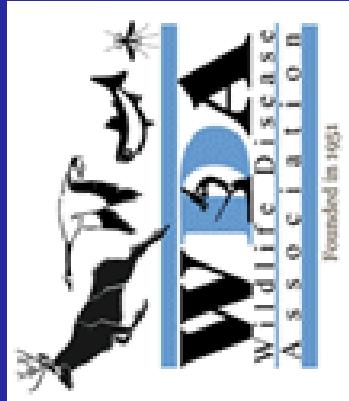


Association of Fish and Wildlife Agencies –
Fish & Wildlife Health Committee



ASSOCIATION of
FISH & WILDLIFE
AGENCIES

Wildlife Disease Association – 1951

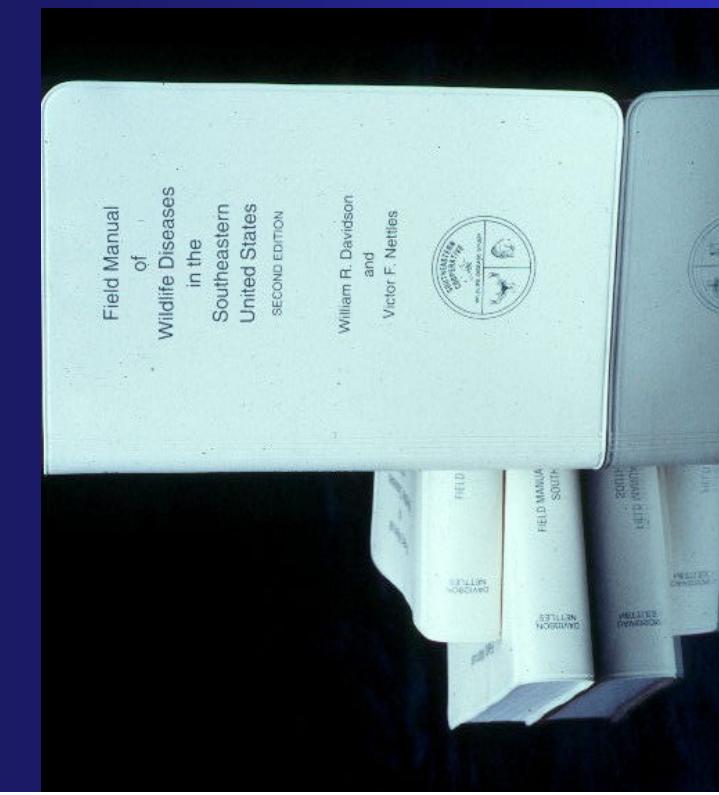


American Assoc of Wildlife Veterinarians



SCWDS

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